IN THE UNITED STATES DISTRICT COURT
FOR THE WESTERN DISTRICT OF TEXAS
WACO DIVISION

WSOU INVESTMENTS, LLC d/b/a BRAZOS LICENSING AND DEVELOPMENT,	§ § § §	
Plaintiff,	§ § §	CIVIL ACTION NO. 6:20-cv-582 **JURY TRIAL DEMANDED**
v.	§ §	
GOOGLE LLC,	§ §	
Defendant.	§ § § §	

ORIGINAL COMPLAINT FOR PATENT INFRINGEMENT

Plaintiff WSOU Investments, LLC d/b/a Brazos Licensing and Development ("Brazos" or "Plaintiff"), by and through its attorneys, files this Complaint for Patent Infringement against Google LLC ("Google") and alleges:

NATURE OF THE ACTION

1.   This is a civil action for patent infringement arising under the Patent Laws of the United States, 35 U.S.C. §§ 1, *et seq.*, including §§ 271, 281, 284, and 285.

THE PARTIES

2.   Brazos is a limited liability corporation organized and existing under the laws of Delaware, with its principal place of business at 605 Austin Avenue, Suite 6, Waco, Texas 76701.

3.   On information and belief, Google is a Delaware corporation with a physical address at 500 West 2nd Street, Austin, Texas 78701.

JURISDICTION AND VENUE

4.   This is an action for patent infringement which arises under the Patent Laws of the United States, in particular, 35 U.S.C. §§ 271, 281, 284, and 285.

5.   This Court has jurisdiction over the subject matter of this action under 28 U.S.C. §§ 1331 and 1338(a).

6.   This Court has specific and general personal jurisdiction over the defendant pursuant to due process and/or the Texas Long Arm Statute, because the defendant has committed acts giving rise to this action within Texas and within this judicial district. The Court's exercise of jurisdiction over the defendant would not offend traditional notions of fair play and substantial justice because the defendant has established minimum contacts with the forum. For example, on information and belief, the defendant has committed acts of infringement in this judicial district, by among other things, selling and offering for sale products that infringe the asserted patent, directly or through intermediaries, as alleged herein.

7.   Venue is proper in this Court pursuant to 28 U.S.C. §§ 1391 and 1400(b). Google is registered to do business in Texas. Google has offices in this District, has transacted business in this District, and has committed acts of direct and indirect infringement in this District. Google also has a regular and established place of business in this District, as set forth below.

8.   Since 2007, Google has employed "hundreds" of employees in this District in Austin, Texas.[1] As of August 2018, Google had more than 800 employees in Austin.[2] By June of 2019, Google had more than 1,100 employees in Austin.[3] In January 2019, it was reported that Google "signed a lease for an entire 35-story tower that has started construction just east of the Central Library in downtown Austin."[4] Google's 35-story tower in Austin "will have 790,000

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[1] According to Gerardo Interiano, Google's public affairs and government relations manager, in a statement. *See* http://www.statesman.com/business/google-lease-200-000-square-feet-new-downtown-austin-tower/SANZSa3du8QQ4k8ytOC2rJ/
[2] *See* https://www.statesman.com/news/20190131/source-google-to-occupy-35-story-office-tower-in-downtown-austin
[3] *See* https://www.bizjournals.com/austin/news/2019/06/14/google-confirms-austin-expansion-will-begin-moving.html
[4] *Id.*

square feet of space, enough to potentially house about 5,000 people."[5]

Source: https://www.statesman.com/news/20190131/source-google-to-occupy-35-story-office-tower-in-downtown-austin

9. Articles report that Google's office in Austin would "would certainly be one of its most expansive offices in North America."[6]

10. Google has 300,000 square feet of office space in Austin, Texas, at 500 West 2nd Street.[7] Google also has offices on North MoPac Expressway,[8] University Park, and Austin's Children Museum.[9]
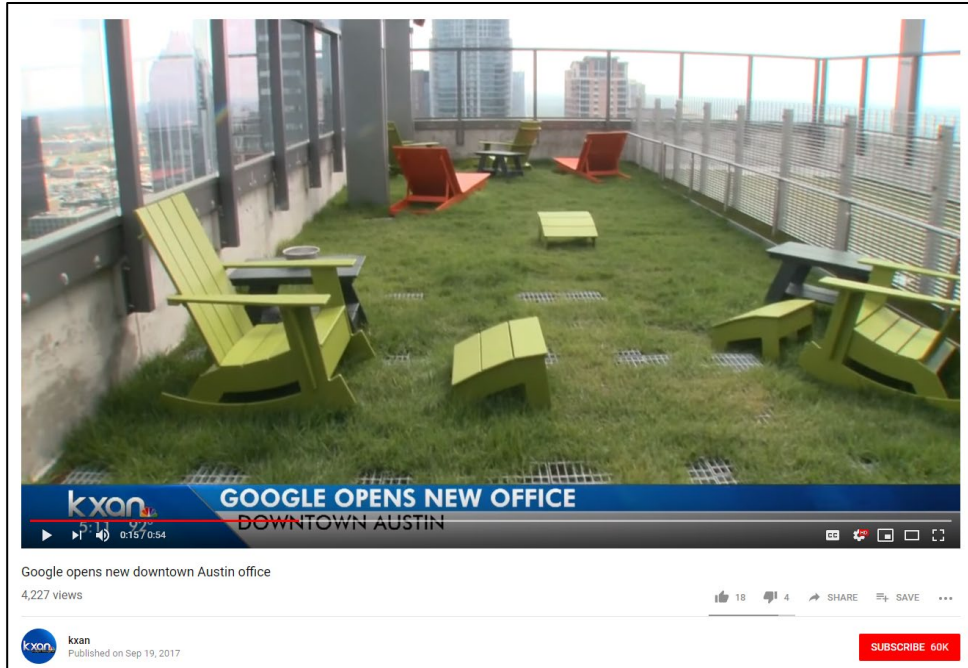
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[5] *Id.*
[6] *See* https://9to5google.com/2019/01/31/google-signs-lease-austin-campus/
[7] *See* https://www.bizjournals.com/austin/news/2020/02/27/google-to-invest-10b-in-offices-and-data-centers.html
[8] *See* https://www.google.com/intl/en/about/locations/?region=north-america
[9] *See* http://www.statesman.com/business/google-lease-200-000-square-feet-new-downtown-austin-tower/SANZSa3du8QQ4k8ytOC2rJ/

Source: https://www.youtube.com/watch?v=RKA1RJYGOYQ

Source: https://www.bizjournals.com/austin/news/2019/10/28/inside-austins-coolest-offices.html#g/419929/15

11.   Google has, as of June 2020, fifty (50) job postings for Austin, TX.[10]

12.   Google's taxed appraised property values in Travis County (Austin) are approximately $1 billion.[11] Google's taxed appraised property values in in McLennan County (Waco) are approximately $75,000.[12] Google's taxed appraised property values in Bexar County (San Antonio) are approximately $50 million.[13] Google's taxed appraised property values in in El Paso are approximately $258,000.[14]

13.   Operationally, Google is a multinational technology company that collects, stores, organizes, and distributes data. In addition to its service model for distribution of data *(e.g., movies, search results, maps, music, etc.)*, Google has an expansive regime that gathers data on residents of this District through the hardware devices it sells (e.g., phones, tablets, and home audio devices) and, also, through the operating systems and apps it provides. As an example, Google gathers data when a resident runs its operating systems and apps *(*e.g., location services).[15] As another example, Google gathers data when a resident interacts with Google's plethora of services such as search, email, and music and movie streaming. *See* https://safety.google/privacy/data/ (indicating that Google gathers data from "things you search for," "Videos you watch," "Ads you view or click," "Your location," "Websites you visit," and "Apps, browsers, and devices you use to access Google services"). As yet another example, Google gathers data by listening and recording everything a resident says within proximity of one of its products, such as Google

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https://careers.google.com/jobs/results/?company=Google&company=YouTube&hl=en&jlo=en-US&location=Austin,%20TX,%20USA
[11] *See* http://propaccess.traviscad.org
[12] *See* https://propaccess.trueautomation.com/clientdb/Property.aspx?cid=20&prop_id=378970
[13] *See* https://bexar.acttax.com/act_webdev/bexar/showdetail2.jsp?can=000001265355,
[14] *See* http://www.epcad.org/Search?Keywords=GOOGLE+INC&Year=2019
[15] *See* e.g., "AP Exclusive: Google tracks your movements, like it or not," https://apnews.com/828aefab64d4411bac257a07c1af0ecb/AP-Exclusive:-Google-tracks-your-movements,-like-it-or-not

Home.[16] Others have reported that Google gathers "where you've been," "everything you've ever searched – and deleted," "all the apps you use," "all of your YouTube history," "which events you attended, and when," "information you deleted [on your computer]," "your workout routine," "years' worth of photos," and "every email you ever sent."[17]

14.   Google takes these massive amounts of gathered data on residents of this District and monetizes them, for example, through targeted advertising. Some have reported that "creepy" advertisements for items never searched for, but only spoken out loud, appeared. *See* e.g., https://www.youtube.com/watch?v=zBnDWSvaQ1I (conducting test on the term "dog toys" spoken out loud, but never searched; tester claims targeted "dog toy" advertisements only appeared after speaking the phrase out loud).

15.   In addition to extensive data gathering of information on residents of this District, Google has a substantial presence in the District directly through the products and services Google provides residents of this District (some of which also gather data).[18] One of Google's main businesses in this District is delivering information, including digital content such as movies, music, apps, and advertising.

16.   Google describes itself as an "information company."[19] Its vision is "to provide

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[16] *See* https://www.unilad.co.uk/technology/google-is-listening-to-everything-we-say-and-you-can-hear-it-back/ ("Tech giant and the font of all pub quiz knowledge, Google, can quietly record many of the conversations that people have in close proximity to its products.").

[17] *See* https://www.theguardian.com/commentisfree/2018/mar/28/all-the-data-facebook-google-has-on-you-privacy.

[18] Non-limiting examples include Google Search, Maps, Translate, Chrome Browser, YouTube, YouTube TV, Google Play Music, Chromecast, Google Play Movies and TV, Android Phones, Android Wear, Chromebooks, Android Auto, Gmail, Google Allo, Google Duo, Google+, Google Photos, Google Contacts, Google Calendar, Google Keep, Google Docs, Google Sheets, Google Slides, Google Drive, Google Voice, Google Assistant, Android operating system, Project Fi Wireless phone systems, Google Pixel, Google Home, Google Wifi, Daydream View, Chromecast Ultra.

[19] *See* "This Year's Founder's Letter" by Alphabet CEO, Sundar Pichai, https://blog.google/inside-google/alphabet/this-years-founders-letter/.

access to the world's information in one click," and its mission is "to organize the world's information and make it universally accessible and useful."[20] Making information available to people wherever they are and as quickly as possible is critical to Google's business.

Google Global Cache (GGC)

17.   As Google's CEO, Sundar Pichai, explains, "We want to make sure that no matter who you are or where you are or how advanced the device you are using—Google works for you."[21] To meet this goal, Google developed a content delivery network that it calls the Edge Network.

18.   One non-limiting example of physical presence in this District is Google's Edge Network. Google provides web-based services, such as YouTube, YouTube TV, and Google Play, to users throughout the world. These services are in high demand. Google reports that Google Play reaches more than 1 billion Android users and that YouTube serves over 1.8 billion users per month.[22] Studies show that YouTube alone is responsible for approximately 20% of all internet traffic.[23] YouTube TV, which has been described as an "add-on to YouTube" allows Google to essentially become the local TV provider for residents of this District. For example, residents in this District obtain local Waco-Temple-Bryan area channels such as KXXV, ABC (Channel 25); KBTX, CBS (Channel 3) or KWTX, CBS (Channel 10); KCEN NBC (Channel 5); and KCEN, Fox (Channel 6).[24]   To verify a resident should receive such local channels, Google verifies a location of such resident.

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[20] *See* http://panmore.com/google-vision-statement-mission-statement.
[21] *See* e.g., http://time.com/4311233/google-ceo-sundar-pichai-letter/.
[22] *See* https://www.theverge.com/2018/5/3/17317274/youtube-1-8-billion-logged-in-monthly-users-brandcast-2018
[23] *See* https://www.sandvine.com/hubfs/downloads/archive/2016-global-internet-phenomena-report-latin-america-and-north-america.pdf and http://testinternetspeed.org/blog/half-of-all-internet-traffic-goes-to-netflix-and-youtube/
[24] *See*, e.g. https://thestreamable.com/markets/waco-temple-bryan-tx.

19.   Google's Edge Network, itself, has three elements: Core Data Centers, Edge Points of Presence, and Edge Nodes. The Core Data Centers (there are eight in the United States) are used for computation and backend storage. Edge Points of Presence are the middle tier of the Edge Network and connect the Data Centers to the internet. Edge Nodes are the layer of the network closest to users. Popular content, including YouTube TV, YouTube, video advertising, music, mobile apps, and other digital content from the Google Play store, is cached on the Edge Nodes, which Google refers to as Google Global Cache or "GGC."

20.   Google Global Cache is recognized as "one of Google's most important pieces of infrastructure,"[25] and Google uses it to conduct the business of providing access to the world's information. GGC servers in the Edge Nodes function as local data warehouses, much like a shoe manufacturer might have warehouses around the country. Instead of requiring people to obtain information from distant Core Data Centers, which would introduce delay, Google stores information in the local GGC servers to provide quick access to the data.

21.   Caching and localization are vital for Google's optimization of network resources. Because hosting all content everywhere is inefficient, it makes sense to cache popular content and serve it locally. Doing so brings delivery costs down for Google, network operators, and internet service providers. Storing content locally also allows it to be delivered more quickly, which improves user experience. Serving content from the edge of the network closer to the user improves performance and user happiness. To achieve these benefits, Google has placed Edge Nodes throughout the United States, including in this District. Google describes these nodes as the workhorses of video delivery.

22.   Just like brick-and-mortar stores, Google's GGC servers independently determine

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[25] *See* http://blog.speedchecker.xyz/2015/11/30/demystifying-google-global-cache/.

what content to cache based on local requests. The GGC servers in Google's Edge Nodes include software that Google refers to as "µstreamer." µstreamer is responsible for serving video content from YouTube and other Google services, along with other large content such as Google Play applications and Chrome downloads. It operates on a content-delivery platform at the edge of Google's network called "bandaid"; it does not run in the core (except for some internal testing purposes), unlike the majority of the Google services, such as search or gmail.

23. Using µstreamer and bandaid, a GGC server handles requests directly from its clients, predominantly YouTube's video players. When such a request is received, if the content is stored in the node's local cache, the node will serve it to the end user, improving the user experience and saving bandwidth. If cache-eligible content is not already stored on the node, and the content is cache-eligible, the node will retrieve it from Google, serve it to the user, and store it for future requests.

24. µstreamer is largely autonomous, in the sense that almost all decisions related to serving a particular request are made locally, without coordinating with other servers. Like a brick-and-mortar store sells directly to customers from inventory and stocks that inventory based on local customer demand, µstreamer in each GGC node decides—independently from other nodes in Google's Edge Network— whether to serve requested content, whether to cache content, and whether to send requests to other servers.

25. Google's GGC servers are housed in spaces in the District leased by Google. Google's GGC servers are housed in spaces leased by Google from Internet Service Providers (ISPs) whose networks have substantial traffic to Google and are interested in saving bandwidth. Hosting Google servers allows ISPs to save both bandwidth and costs, as they do not incur the expense of carrying traffic across their peering and/or transit links.

26.	When an ISP agrees to host a GGC server, the parties enter into a Global Cache Service Agreement, under which Google provides:

- hardware and software— including GGC servers and software—to be housed in the host's facilities;

- technical support; service management of the hardware and software; and

- content distribution services, including content caching and video streaming.

In exchange, the host provides, among other things, a physical building, rack space where Google's computer hardware is mounted, power, and network interfaces. All ownership rights, title, and intellectual property rights in and to the equipment (i.e., the hardware and software provided by Google) remain with Google and/or its licensors.

27.	Multiple ISP hosted GGC servers are in this District. Google's website identifies Midland, El Paso, Austin, and San Antonio as GGC server locations. Each of these cities is located in this District.
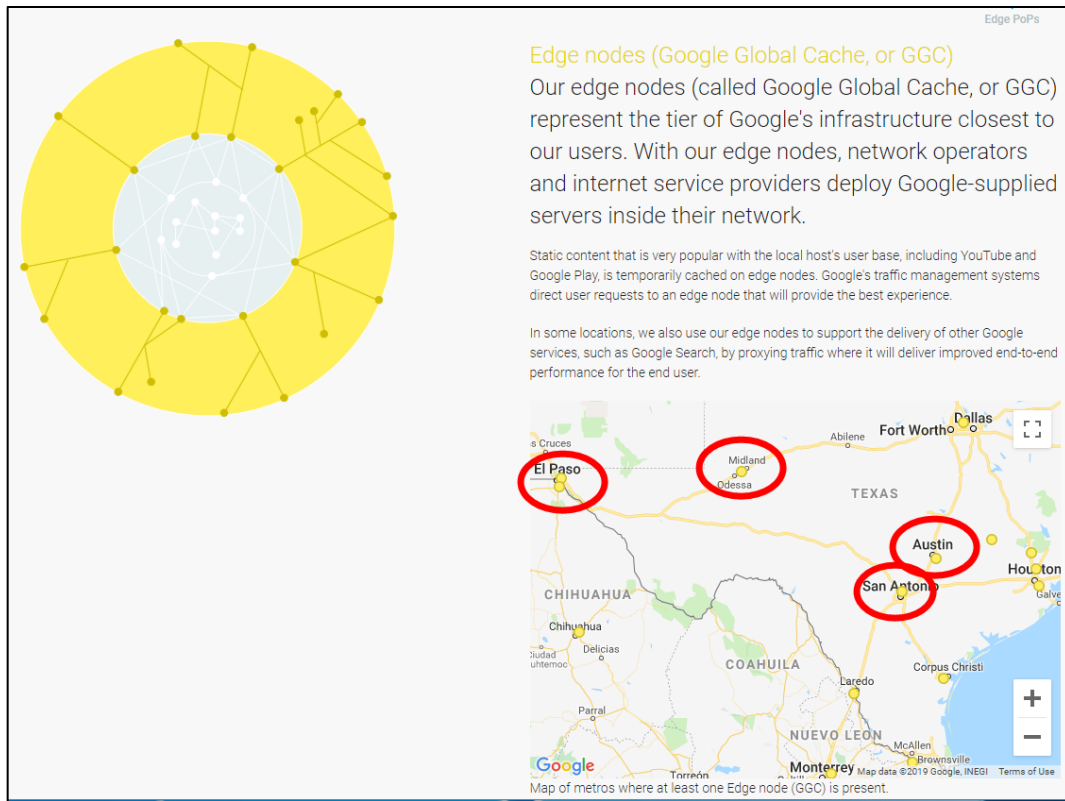
Source: https://peering.google.com/#/infrastructure

28.   The Office of Telecommunications Services for the University of Texas, for example, is an ISP that hosts two GGC servers in Austin, Texas.[26]

29.   Google caches content on the GGC servers located in this District.

30.   Google's GGC servers located in this District cache content that includes, among other things: (i) video advertising; (ii) apps; and (iii) digital content from the Google Play store.

31.   Google's GGC servers located in this District deliver cached content for the items in the preceding paragraph to residents in this District.

32.   Google generates revenue (i) by delivering video advertising, (ii) from apps, and (iii) from digital content in the Google Play store.

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[26] *See* https://it.utexas.edu/ots-caching-and-peering

33.   Google treats its GGC servers in this District the same as it treats all of its other GGC servers in the United States.

34.   The photograph below shows an "illustrative picture" of a Google GGC server.

Source: https://www.wired.com/2010/03/google-traffic/
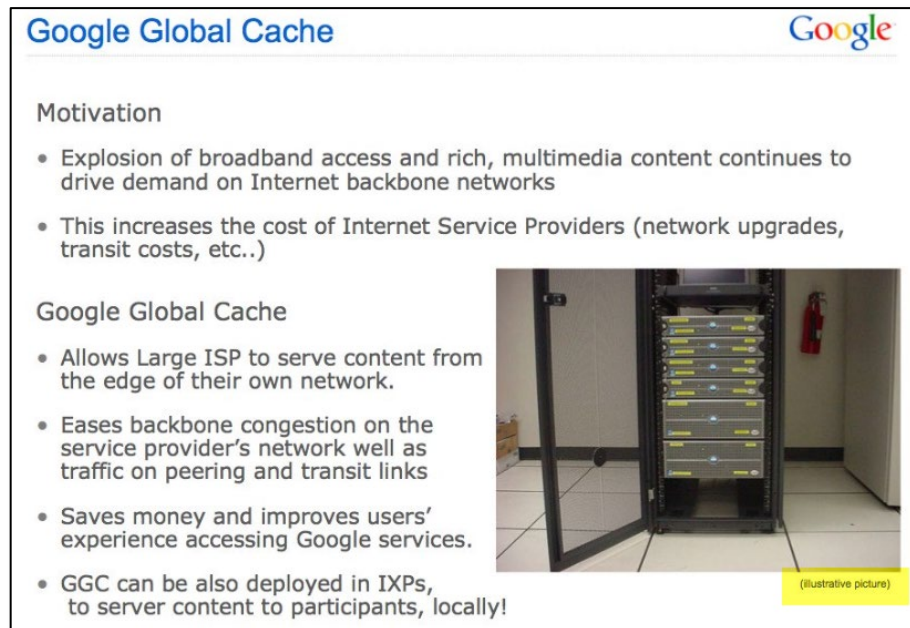
35.   Google not only exercises exclusive control over the digital aspects of the GGC, Google, but also exercises exclusive control over the physical server and the physical space within which the server is located and maintained.

Google's Communication Services

36.   Google provides both data and television services to both San Antonio and Austin.[27]

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[27] https://fiber.google.com/ourcities/
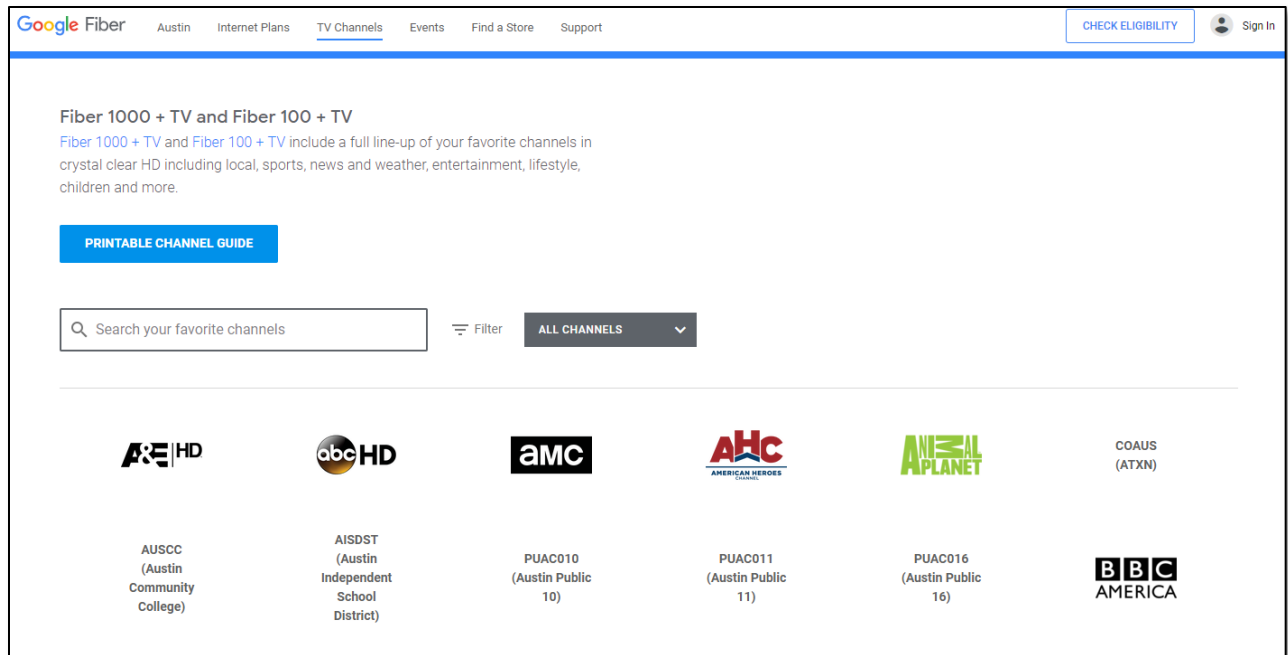
Google's Cell Phone Service (aka Google Fi)

37.   Google also provides phone, messaging, and data services in this District from its wireless phone services called Google Fi.   Via the Google Fi service, Google provides its customers voice and high-speed data coverage (4G LTE) for cities such as Waco.

Source: https://fi.google.com/coverage?q=Waco,%20tx
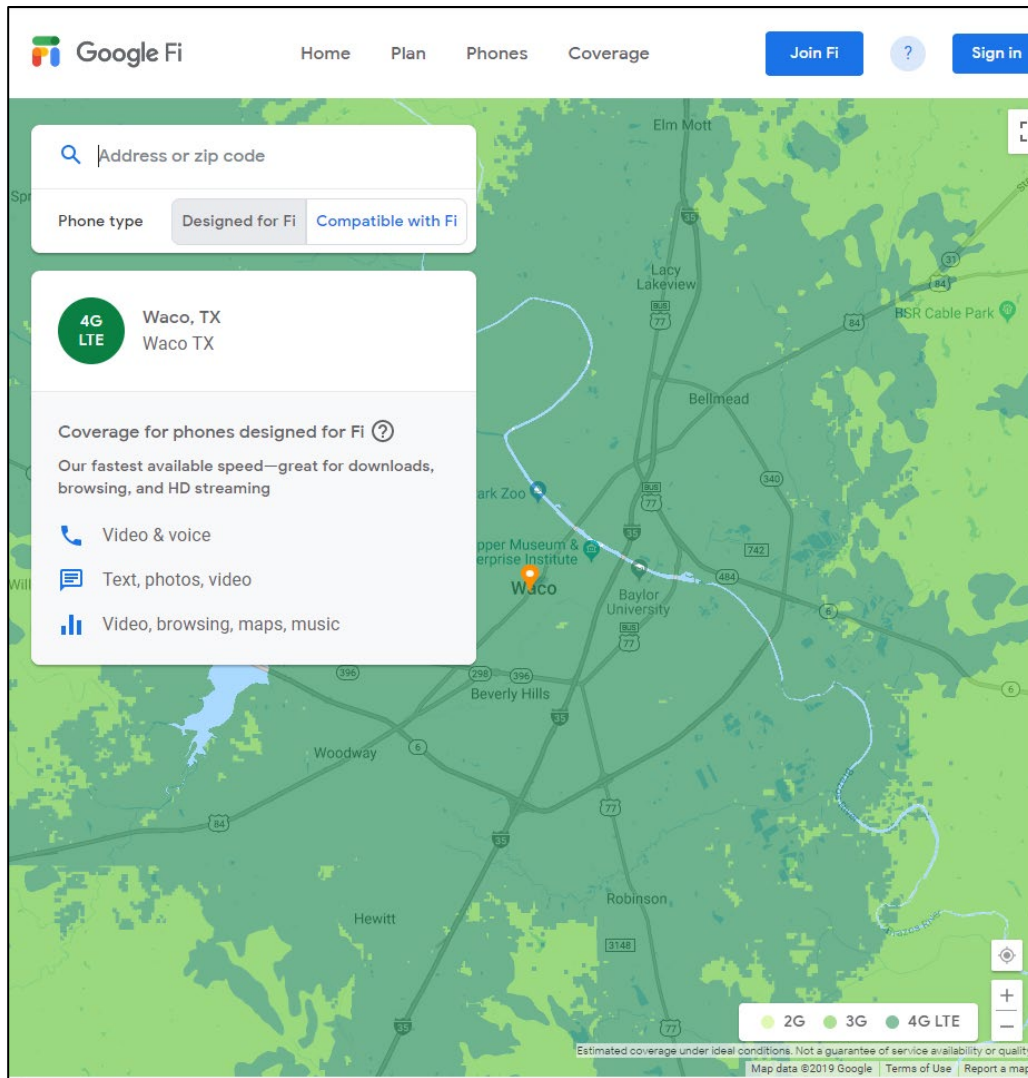
38.   The cell towers used for Google's services are fixed geographical locations. They are "regular" and "established" because they operate in a "steady, uniform, orderly, and methodical manner" and are sufficiently permanent. They are "of the defendant" because Google has contractual and/or property rights to use the cell towers to operate its business. Google also ratifies the service locations through its coverage lookup service.

39.   With this coverage lookup service, Google advertises its ability to provide cell coverage in this District and its selected cell towers in and near this District to provide the

advertised coverage (e.g., 2G, 3G, or 4GLTE) depending on the location in the District. See https://fi.google.com/coverage?. Google is not indifferent to the location of its cell towers. It "established" and "ratified" their geographic placement to achieve specific business purposes.

40.   Residents of this District also directly contract with and are billed by Google for these services as their telecommunications provider.

Source: https://fi.google.com/about/plan
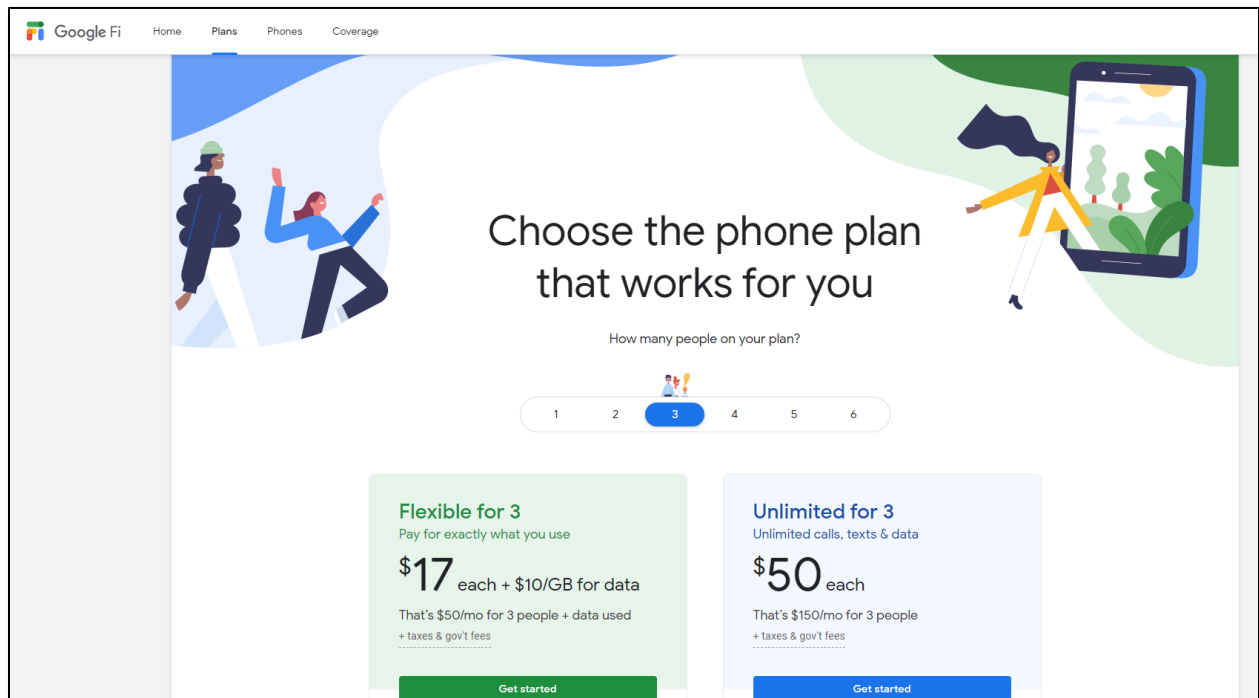
41.   Google also determines which cell tower a particular Google Fi customer will use while within the District.

Source: https://fi.google.com/about/faq/#network-and-coverage-4

COUNT ONE - INFRINGEMENT OF U.S. PATENT NO. 8,238,681

42.   Brazos re-alleges and incorporates by reference the preceding paragraphs of this Complaint.

43.   On August 7, 2012, the United States Patent and Trademark Office duly and legally issued U.S. Patent No. 8,238,681 ("the '681 Patent"), entitled "Adaptive configuration of windows-of-interest for accurate and robust focusing in multispot autofocus cameras." A true and correct copy of the '681 Patent is attached as Exhibit A to this Complaint.

44.   Brazos is the owner of all rights, title, and interest in and to the '681 Patent, including the right to assert all causes of action arising under the '681 Patent and the right to any remedies for the infringement of the '681 Patent.

45.   Google makes, uses, sells, offers for sale, imports, and/or distributes in the United States, including within this judicial district, products such as, but not limited to, products using multi-spot autofocus (collectively, the "Accused Products").

46.   The Accused Products include, but are not limited to, the Google Pixel 4.

47.   Google Pixel 4 is a smartphone launched by Google. Google Pixel 4 provides a post-shutter autofocus feature where two different autofocus frames are used for focusing the lens. A focusing area of interest is divided into multiple parts and are assigned with focus values based on the contrast-based autofocus system and reinforcing the weights of the two frames.

48.   The Accused Products provide a feature of Night Sight which helps a user in capturing photographs in low light conditions.

Astrophotography with Night Sight on Pixel Phones

Tuesday, November 26, 2019

Posted by Florian Kainz and Kiran Murthy, Software Engineers, Google Research

Taking pictures of outdoor scenes at night has so far been the domain of large cameras, such as DSLRs, which are able to achieve excellent image quality, provided photographers are willing to put up with bulky equipment and sometimes tricky postprocessing. A few years ago experiments with phone camera nighttime photography produced pleasing results, but the methods employed were impractical for all but the most dedicated users.

Night Sight, introduced last year as part of the Google Camera App for the Pixel 3, allows phone photographers to take good-looking handheld shots in environments so dark that the normal camera mode would produce grainy, severely underexposed images. In a previous blog post our team described how Night Sight is able to do this, with a technical discussion presented at SIGGRAPH Asia 2019.

This year's version of Night Sight pushes the boundaries of low-light photography with phone cameras. By allowing exposures up to 4 minutes on Pixel 4, and 1 minute on Pixel 3 and 3a, the latest version makes it possible to take sharp and clear pictures of the stars in the night sky or of nighttime landscapes without any artificial light.

Source: https://ai.googleblog.com/2019/11/astrophotography-with-night-sight-on.html

49.   The Accused Products use phase and contrast-based strategies for accurate autofocus as shown. The contrast-based autofocus system would assign different weights to pixels in an area of interest (i.e. sub-window of interest) based on the determined contrast values of pixels (i.e. according to spatial weight maps, an area of interest would have multiple weights based on the importance of the region).

50.   The pixels in an area of interest (i.e. sub-window of interest) with higher (i.e. sharp) contrast would have a higher weight and the neighboring pixels would have lower weights based on the relative contrast values.

51.   Below shows parts of camera API (i.e. deprecated from API level 21) which shows focus areas (i.e. areas of interest/a plurality of sub-windows of interest) are arranged in a grid formation.

Metering and focus areas

In some photographic scenarios, automatic focusing and light metering may not produce the desired results. Starting with Android 4.0 (API Level 14), your camera application can provide additional controls to allow your app or users to specify areas in an image to use for determining focus or light level settings and pass these values to the camera hardware for use in capturing images or video.

Areas for metering and focus work very similarly to other camera features, in that you control them through methods in the `Camera.Parameters` object. The following code demonstrates setting two light metering areas for an instance of `Camera` :

Source: https://developer.android.com/guide/topics/media/camera

The `Camera.Area` object contains two data parameters: A `Rect` object for specifying an area within the camera's field of view and a weight value, which tells the camera what level of importance this area should be given in light metering or focus calculations.

The `Rect` field in a `Camera.Area` object describes a rectangular shape mapped on a 2000 x 2000 unit grid. The coordinates -1000, -1000 represent the top, left corner of the camera image, and coordinates 1000, 1000 represent the bottom, right corner of the camera image, as shown in the illustration below.
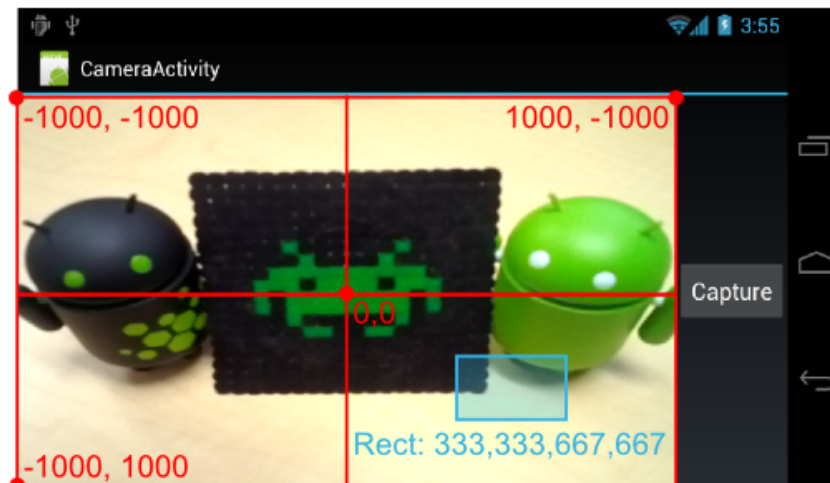

Figure 1. The red lines illustrate the coordinate system for specifying a `Camera.Area` within a camera preview. The blue box shows the location and shape of an camera area with the `Rect` values 333,333,667,667.

Source: https://developer.android.com/guide/topics/media/camera.

      52.   The below figures show metering areas for autofocus (i.e. areas of interest) from camera2 API of Google (added in API level 21) identical to that of metering and focus areas of camera API.

```
CONTROL_AF_REGIONS 🔗                                          Added in API level 21

public static final Key<MeteringRectangle[]> CONTROL_AF_REGIONS

List of metering areas to use for auto-focus.

Not available if CameraCharacteristics#CONTROL_MAX_REGIONS_AF is 0. Otherwise will always be present.
```

Source:
https://developer.android.com/reference/android/hardware/camera2/CaptureRequest.html#CONTROL_AF_REGIONS

> **Autofocus.** Consistent and accurate autofocus (AF) is a prerequisite for sharp output images. AF in low-SNR scenes is fundamentally difficult, and beyond the scope of this paper. We use the device's AF out of the box, which employs both phase- and contrast-based strategies, but isn't optimized for very low-light conditions. Empirical experiments show that our camera's AF fails almost 50% of the time when the scene luminance is around 0.4 lux. We mitigate this issue by locking the lens's focus distance to the hyperfocal distance when the AF system reports a focus failure. When the lens is at the hyperfocal distance, everything from a certain distance out to infinity is in acceptable focus, and the depth of field is maximized,

Source: https://arxiv.org/pdf/1910.11336.pdf

> After motion magnitude has been measured across the scene, the measurements are aggregated into a single scalar value by taking a weighted average. Typically, a center-weighted average is used, where motion in the center of the scene is weighted highly, and motion on the outside of the scene is discounted. Humans viewing photographs are particularly perceptive to motion blur on faces, therefore, if a face is detected in the scene by a separate automatic system such as (Howard et al. 2017), then the area of the face is weighted higher compared to the rest of the scene. The same type of weighting occurs if a user manually selects an area of the scene. Spatial weight maps of this kind are common in many auto-exposure and autofocus systems.

Source: https://arxiv.org/pdf/1910.11336.pdf

53.   The Accused Product provide a feature of post-shutter autofocus mode, where two

autofocus frames are captured with exposure times up to one second after a user presses the shutter

button. These frames are used to focus the lens (i.e. adjusting the lens via autofocus algorithm). The contrast-based autofocus system assigns weights to the pixels of the areas of interest (i.e. a plurality of sub-windows of interest) in the captured autofocus frames.

54.   The Accused Product process the two frames containing various areas of interest (i.e. a plurality of sub-windows of interest) to focus the lens. The weights in the common areas of interest (i.e. a plurality of sub-windows of interest) in both the frames are reinforced.

55.   The Accused Product combine (i.e. average) the weights of the pixels in an area of interest (i.e. sub-window of interest) common in both the frames so that any shift in the frames (i.e. thus shift in the areas of interest) due to camera motion (i.e. shaking) could be accounted.

56.   Reinforcement of weights of the two frames would logically divide an area of interest (i.e. sub-window of interest) into parts. The region in the area of interest with least shift (i.e. due to camera motion) would have a maximum average weight (i.e. forms a logical part) and the regions would form different logical parts based on the direction of shift and averaged weights (i.e. a logical part with maximum weight at the center and the weights gradually reducing outwards forming various logical parts).

Autofocus
Autofocus ensures that the image captured by the camera is sharp. In normal operation, the incoming viewfinder frames are analyzed to determine how far the lens must be from the sensor to produce an in-focus image, but in very low light the viewfinder frames can be so dark and grainy that autofocus fails due to lack of detectable image detail. When this happens, Night Sight on Pixel 4 switches to "post-shutter autofocus." After the user presses the shutter button, the camera captures two autofocus frames with exposure times up to one second, long enough to detect image details even in low light. These frames are used only to focus the lens and do not contribute directly to the final image.

Source: https://ai.googleblog.com/2019/11/astrophotography-with-night-sight-on.html

57.   The Accused Products provide a feature of post-shutter autofocus mode, where two autofocus frames are captured with exposure times up to one second after a user presses the shutter button. These frames are used to focus the lens (i.e. adjusting the lens via autofocus algorithm) as

shown. The contrast-based autofocus system assigns weights to the pixels of the regions of interest (i.e. a plurality of sub-windows of interest) in the captured autofocus frames.

58. The Accused Products process the two frames containing various areas of interest (i.e. a plurality of sub-windows of interest) to focus the lens. The weights in the common areas of interest (i.e. a plurality of sub-windows of interest) in both the frames are reinforced.

59. The Accused Products combine (i.e. average) the weights of the pixels in a region of interest (i.e. sub-window of interest) common in both the frames so that any shift in the frames (i.e. thus causing a shift in the areas of interest) due to camera motion (i.e. shaking) could be accounted.

60. The reinforcement of weights of the two frames forms various logical parts in an area of interest (i.e. sub-window of interest), where one of the logical parts (i.e. first logical part) would be closest to at the center due to the maximum average of weights (i.e. maximum focus value of Value1) due to least shift of the area of interest and various logical parts formed away from the center (i.e. logical part 2 and logical part 3 respectively) due to the decrease in average of weights gradually (i.e. focus values of Value2 and Value3 respective) outwards.

61. The averaged weights (i.e. focus values) could be rational numbers based on the assigned weights to the pixels in the area of interest (i.e. a plurality of sub-windows of interest).

62. The two autofocus frames (i.e. the areas of interest, focus values/averaged weights) would be used by the autofocus algorithm to focus the lens.

> **Autofocus**
> Autofocus ensures that the image captured by the camera is sharp. In normal operation, the incoming viewfinder frames are analyzed to determine how far the lens must be from the sensor to produce an in-focus image, but in very low light the viewfinder frames can be so dark and grainy that autofocus fails due to lack of detectable image detail. When this happens, Night Sight on Pixel 4 switches to "post-shutter autofocus." After the user presses the shutter button, the camera captures two autofocus frames with exposure times up to one second, long enough to detect image details even in low light. These frames are used only to focus the lens and do not contribute directly to the final image.

Source: https://ai.googleblog.com/2019/11/astrophotography-with-night-sight-on.html

63.   In view of preceding paragraphs, each and every element of at least claim 1 of the '681 Patent is found in the Accused Products.

64.   Google continues to directly infringe at least one claim of the '681 Patent, literally or under the doctrine of equivalents, by making, using, selling, offering for sale, importing, and/or distributing the Accused Products in the United States, including within this judicial district, without the authority of Brazos.

65.   Google has received notice and actual or constructive knowledge of the '681 Patent since at least the date of service of this Complaint.

66.   Since at least the date of service of this Complaint, through its actions, Google has actively induced product makers, distributors, retailers, and/or end users of the Accused Products to infringe the '681 Patent throughout the United States, including within this judicial district, by, among other things, advertising and promoting the use of the Accused Products in various websites, including providing and disseminating product descriptions, operating manuals, and other instructions on how to implement and configure the Accused Products. Examples of such advertising, promoting, and/or instructing include the documents at:

- https://arxiv.org/pdf/1910.11336.pdf
- https://ai.googleblog.com/2019/11/astrophotography-with-night-sight-on.html

- https://developer.android.com/reference/android/hardware/camera2/CaptureRequest.html#CONTROL_AF_REGIONS
- https://developer.android.com/guide/topics/media/camera

67.   Since at least the date of service of this Complaint, through its actions, Google has contributed to the infringement of the '681 Patent by having others sell, offer for sale, or use the Accused Products throughout the United States, including within this judicial district, with knowledge that the Accused Products infringe the '681 Patent. The Accused Products are especially made or adapted for infringing the '681 Patent and have no substantial non-infringing use. For example, in view of the preceding paragraphs, the Accused Products contain functionality which is material to at least one claim of the '681 Patent.

JURY DEMAND

Brazos hereby demands a jury on all issues so triable.

REQUEST FOR RELIEF

WHEREFORE, Brazos respectfully requests that the Court:

(A)   Enter judgment that Google infringes one or more claims of the '681 Patent literally and/or under the doctrine of equivalents;

(B)   Enter judgment that Google has induced infringement and continue to induce infringement of one or more claims of the '681 Patent;

(C)   Enter judgment that Google has contributed to and continue to contribute to the infringement of one or more claims of the '681 Patent;

(D)   Award Brazos damages, to be paid by Google in an amount adequate to compensate Brazos for such damages, together with pre-judgment and post-judgment interest for the infringement by Google of the '681 Patent through the date such judgment is entered in accordance

with 35 U.S.C. § 284, and increase such award by up to three times the amount found or assessed in accordance with 35 U.S.C. § 284;

(E)   Declare this case exceptional pursuant to 35 U.S.C. § 285; and

(F)   Award Brazos its costs, disbursements, attorneys' fees, and such further and additional relief as is deemed appropriate by this Court.

Dated: June 29, 2020   Respectfully submitted,

/s/ James L. Etheridge
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